

Noiseless Switching Power Supply ZM460-APS

(English)

User's Manual



Please read this manual first before using product

ZALMAN
Zalman Tech Co., Ltd.

1. Safety Precautions

- The following safety precautions and directions for use are meant to prevent accident and injury. Please read thoroughly before using the product.

Warnings

Serious injury or death can occur.

- ▶ Opening the cover of the product while the power cord is plugged into the outlet can result in electrocution or critical damage to the product.
- ▶ Handling the power cord with wet hands can result in electrocution.
- ▶ Inserting fingers or metallic objects into the cooling fan can result in injury or electrocution.

Cautions

Minor injury can occur. May degrade product conditions or cause malfunction.

- ▶ Operating in an extremely cold or hot environment can degrade product performance and lifespan.
- ▶ Allowing liquid to get into the product can result in malfunction.
- ▶ Operating in a humid or non-ventilated environment can reduce product lifespan.

2. Components

- 1) One Power Supply
- 2) One FAN Multi-connector (ZM-MC1)
 (For supplying power to an extra fan. See page 5 for details.)
- 3) One S-ATA power convert cable
- 4) One PCI-Express VGA SLI sub-Cable for power conversion
- 5) One Power Cord for AC Power Source (Not included in some countries)
- 6) One User's Manual
- 7) Zalman Cable Tie

3. Notes on Installation

- ※ To ensure safe and easy installation, first read the Safety Precautions above, then read the following notes.
- Plugging the main power connector P1 into the main board while the product is connected to the AC power source may result in damage to the main board.
- Do not insert the DC output connectors with too much force into devices as the shape of the connector is meant to prevent incorrect insertion.
- After installation, if the Power On light on the case does not light up when the main power button is pressed, some devices may be plugged in incorrectly or the main board may be faulty. Please double-check the installation.

* For more information on the product, please visit our website at www.zalman.co.kr.

4. The Zalman Advantage

With the goal of enhancing your computing environment, all Zalman Tech products are ultra-quiet. This product is an ultra quiet 460W ATX Ver. 2.03 / ATX12V Ver. 2.01 power supply supporting SLI-capable Intel LGA775 Pentium 4 & AMD Athlon 64/64 FX CPU equipped systems.

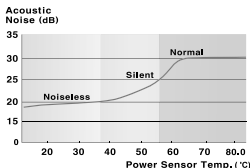
■ CNPS (Computer Noise Prevention System) with Auto Control Cooling Fan

By implementing heat-sensor circuitry that controls the cooling fan's speed (rpm) in relation to the temperature within the power supply, noise has been greatly reduced.

The graph below shows the CNPS characteristics of our product.

※ CNPS (Computer Noise Prevention System) refers to a system that reduces a conventional computer's noise (30dB or more) to an inaudible level (20dB or less). In order to create a true noise-free computer, Zalman's other noise-free products should be used together with this product.

◆ Fig.1: Noise Level(dB) Changes In relations to Power Supply's Internal Temperature



Noise Level of ZM460-APS (in dB)

※ The graph above shows that the ZM460-APS in "Noiseless" or "Silent" mode can operate when the power supply's internal temperature is kept below 56°C. This information is in compliance with the 2nd Revision of ISO7779, an international standard for noise level measurement. Results may vary for different system configuration and/or the test environment.

■ Improving Power Factor & Eliminating Harmonics through Active PFC

By implementing Active PFC, the power factor (PF) is improved from 75% (Passive PFC) to 96% (230VAC, Full load), while harmful harmonic frequencies are reduced below regulatory requirements.

■ High Efficiency Design

Designed with a high switching frequency and low power-loss circuitry, the efficiency of this product exceeds 80% (230VAC, Full load).

* For more information on the product, please visit our website at www.zalman.co.kr.

■ ATX “20+4” - Pin Main Connector

ATX “20+4” - Pin main connector broadens mainboard compatibility.

■ ATX12V CPU (4-Pin) & EPS12V CPU (8-Pin) Connectors

Use two ATX12V 2*2(4-pin) connectors together to form an EPS12V CPU connector(8-pin).

■ PCI-Express Graphics Card Power Connector (6-Pin)

PCI-Express graphics card power connector is provided to high-end graphics card support.

■ EZ Connectors for ODD & HDD

EZ Connectors for ODD & HDD for easy connecting and disconnecting of the plugs.

■ Dual +12VDC Output

Two +12VDC rails output up to 30A combined, providing more stable power to high-end systems.

■ Sleeved Cables

All power cables are sleeved for easy cable management and improved air circulation in the computer's case.

■ Certified with International Safety Approvals & EMC Standards



E198072

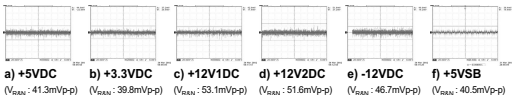


E-I011-05-1869(B)

FCC IDENTIFIER :
SAOZM460-APS

■ Strict DC Voltage Regulation & Low Output Ripple / Noise

The following figures show the ripple and noise measured from the DC output of the ZM460-APS.



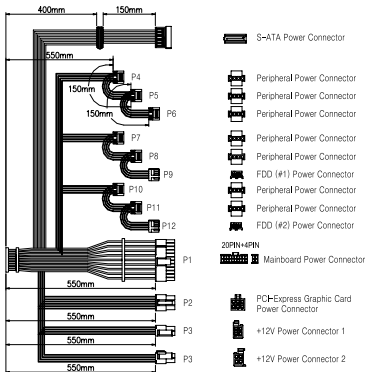
※ Each DC output had a 0.1 μ F ceramic capacitor and a 10 μ F electrolytic capacitor attached as the bypass and the oscilloscope (input impedance 1M Ω) measured the waveforms at 20MHz frequency bandwidth. The waveforms may differ with varying measurement conditions.

* For more information on the product, please visit our website at www.zalman.co.kr.

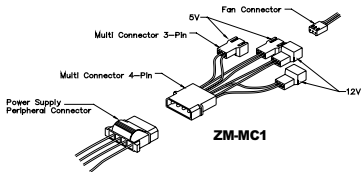
5. Specifications

■ Output Power Cable Specifications

Cable Lengths & Connector Names



Using the Multi-Connector (ZM-MC1)



* For more information on the product, please visit our website at www.zalman.co.kr.

■ Electrical & Physical Characteristics

AC Input Range	Voltage	100VAC ~ 240VAC $\pm 10\%$			Vout	DC OUTPUT			Combined Power	
	Frequency	47Hz ~ 63Hz				Output Load Rating				
AC Input Range (Rated)	115VAC	7.5A			+3.3V	Imin	Imax	Ipeak	180W	460W
	230VAC	3.5A				0.3A	28A			
PFC Type	Active PFC				+5V	0.5A	30A		360W	
Power Factor	96% minimum @ 230VAC, Full load				+12V 1	1A	16A	19A		
Inrush Current Limit (@ Cold start at 25°C)	115VAC	80A			+12V 2	1A	18A	22A		
	230VAC	120A			-12V	0.0A	0.8A			
Efficiency	80% minimum @ 230VAC, Full Load				+5VSB	0.0A	2.0A			
DC output Voltage Regulations	Vout	Regulation Range			at Full Load	Protection				
	+3.3VDC	$\pm 5\%$	+3.14V	~ +3.45V		Over-Voltage Protection (OVP)				
	+5VDC	$\pm 5\%$	+4.75V	~ +5.25V		Over-Current Protection (OCP)				
	+12V 1DC	$\pm 5\%$	+11.4V	~ +12.6V		Short-Circuit Protection (SCP)				
	+12V 2DC	$\pm 5\%$	+11.4V	~ +12.6V		Over-Temperature Protection (OTP)				
	-12VDC	$\pm 10\%$	-10.8V	~ -13.2V		Under-Voltage Protection (UVP)				
	+5VSB	$\pm 5\%$	+4.75V	~ +5.25V		Ambient Temperature				
DC output Voltage Regulations	Vout	Specification			at Full Load	Operation	0°C ~+50°C			
	+3.3VDC	50mV				Storage	-20°C ~+80°C			
	+5VDC	50mV				Ambient Humidity				
	+12V 1DC	120mV				Operation	5% RH ~ 95% RH			
	+12V 2DC	120mV				Storage	5% RH ~ 95% RH			
	-12VDC	120mV				Dimensions				
	+5VSB	50mV				150mm(L) * 140mm(W) * 86mm(H)				

6. Zalman CNPS (Computer Noise Prevention System) Products

To create a true noise-free computer, Zalman's Quiet CPU Cooler, Quiet VGA Cooler, Heatpipe HDD Cooler, Fanless Northbridge Cooler, and Noiseless Case Fan should be used together with this product.



Quiet CPU Cooler



Quiet VGA Cooler



Heatpipe HDD Cooler



Ultra Quiet CPU Cooler



Fanless Northbridge Cooler



Noiseless Case Fan

* For more information on the product, please visit our website at www.zalman.co.kr.

7. Product Warranty (International)

Thank you for purchasing Zalman's product.

Warranty - If this product has any defects, Zalman guarantees that it can be exchanged within one (1) year from the time of purchase.

❖ Product exchange is done with the reseller that the product was purchased from.

For further inquiries, contact Zalman headquarters at www.zalman.co.kr or e-mail a representative.

There will be no exchanges in the following cases :

A) Violation of the Safety Precautions and the Notes on Installation in this manual.

B) Human fatality and/or property damage/ due to events of natural causes.

C) External case damage, electrical problems, and damage to components caused by careless mishandling.



Disposal of Old Electrical & Electronic Equipment
(Applicable in the European Union and other European countries with separate collection systems)

* For more information on the product, please visit our website at www.zalman.co.kr.